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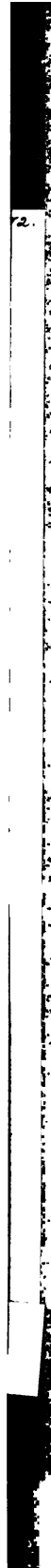
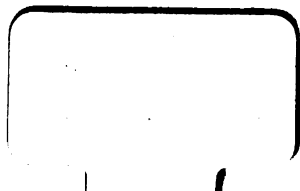
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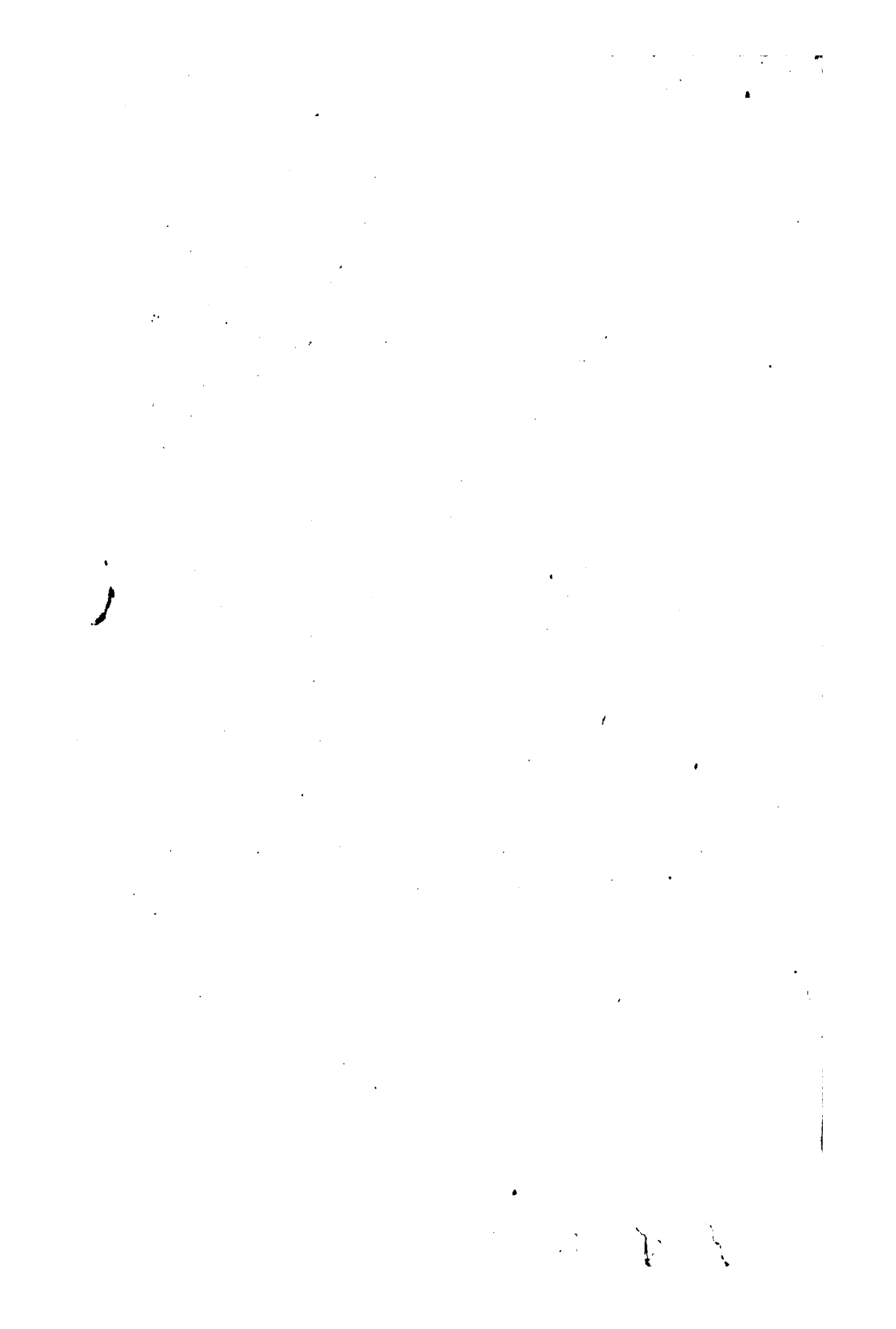
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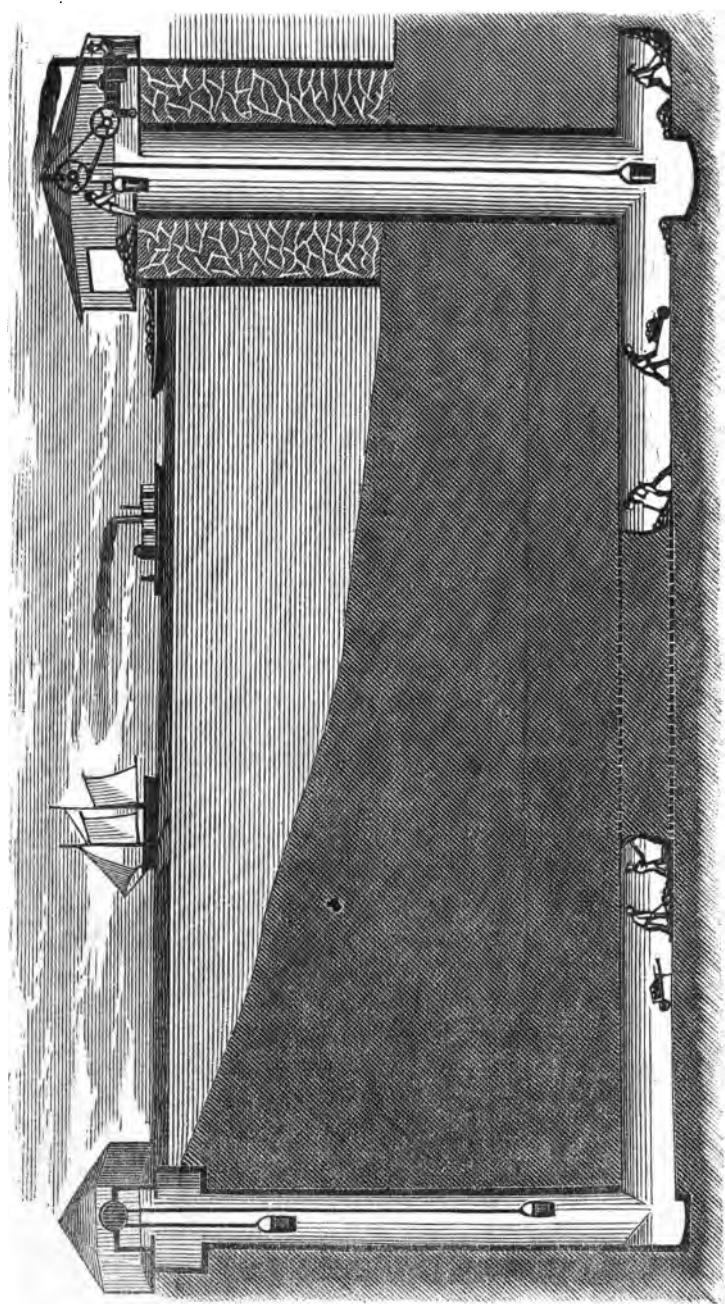
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THE GREAT  
CHICAGO LAKE TUNNEL.

THE  
CAUSES WHICH LED TO ITS CONCEPTION; THE GREAT  
UNDERTAKING; OBSTACLES ENCOUNTERED;  
HOW THE WORK WAS PERFORMED;  
LAUNCH OF THE CRIB, ETC.

TOGETHER WITH  
SKETCHES OF THE VISITS OF SEVERAL ILLUSTRIOUS  
PARTIES TO THE WORKS, AND A MIDNIGHT  
TRAIN OF CARS BENEATH LAKE  
MICHIGAN.

ALSO, THE  
SUCCESSFUL COMPLETION OF THE GREAT ENTERPRISE.

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CHICAGO:  
PUBLISHED BY JACK WING.  
1867.



Eng 1078.67

1867. April 3

Gift of

Horace Parker Chandler,  
of Chicago,

(H.C. 1864.)

# THE GREAT CHICAGO LAKE TUNNEL.

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Ground was first broken for the great CHICAGO LAKE TUNNEL, on St. Patrick's Day, March 17th, 1864. The various causes which led to the undertaking of this gigantic work, and compelled such an enormous expenditure on the part of the city, may be briefly stated. The inhabitants of Chicago are painfully aware of them.

Since Chicago became a city, its great want had been an abundant supply of pure water. This want became more and more pressing as the city increased from a mere handful of settlers to be the teeming mart of the western world. Unlike most other cities, and especially those of the East, the surroundings of the Garden City were no more elevated than the place where the city itself stood, and no flow of water could be secured from any direction whatever. Indeed, the Chicago river possessed no current, being in fact a bayou setting back from the lake, its source on a precise dead level with its mouth.

The astonishing growth of the city, unparalleled in the history of the world, its increasing commerce and trade, combined to render the currentless river a cesspool of filth. Miles of sewerage were constructed, which discharged their

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foul contents into its turbid waters. Hundreds of steam tugs and lake craft plowed its surface, and the refuse and offal from numberless slaughter houses and packing establishments in the vicinity of Bridgeport, on the south branch, found its way into the filthy river. In midsummer the stench emitted from this repository of a city's offal became intolerable; its waters grew thick and slimy, obliging the steam craft that plowed its surface to go far out into the lake to fill their boilers with pure water. Many terrible explosions have been yearly chronicled by the Chicago press, which resulted from the use of the foul water of the river for making steam. The animal matter which it contained generated gas, and explosions followed, which were often disastrous in the extreme.

The waters of Lake Michigan were contaminated and befouled by the influx, rather than current of the river, for a great distance from the shore. A short distance north of the mouth of the river the engines of the city Water Works were at work, pumping this foul liquid into the reservoirs, from whence it found its way into every family in the city. Bridget had no other with which to fill her teakettle, and the laborer must needs quench his thirst with it. It came on the dinner table and made the goblets look dirty; it was tasted from necessity, and that was all. The guests present, from cities blessed with pure water, disdained to taste it, and returned to their homes, declaring that they would not live in Chicago for the world, its water was "so filthy and smelt so bad."

Another grievous evil of the old water system was, that as cold weather approached, millions of infinitesimal fishes sought the enclosure near shore, from which the water was pumped. In spite of every effort, these scaly minnows would enter the reservoirs of the city, and come out in scores from every hydrant, alive and swimming. This was the greatest annoyance of all, and one that could not be brooked. Every drop of water drank in the city was highly flavored of fish,

and one was obliged to look twice in his goblet to see that he did not swallow one alive. Wagon loads of fishes were often seined out of the reservoirs, but this seemed only to increase their numbers, and augment rather than diminish the nuisance. This was the culmination, the climax of endurance. To have living fishes forced down one's throat, to taste, smell and bathe in fishy fluid, was rather too great a torment to be borne. The press cried out against the plague, pronounced it a greater than ever afflicted Egypt, and demanded its abatement. Ladies complained that the avaricious milkmen of the Garden City forgot to take the fish out of the water which they mixed with the lacteal fluid, and fishy milk was the consequence. Wicked liquor dealers were caught in the act of adulterating their goods, pickled minnows being frequently found in their best brands. These were among the unbearable features of the old water works, which rather increased than diminished year by year, the nuisance having been worse the present season (1866) than any previous one, as if to give our citizens the darkest side of the old system just before the new went into operation, that they might the better appreciate the pure water of the Tunnel.

It is useless to add, that whenever Chicago was visited by "down east" literary men or obese aldermen, they returned to their homes to crack jokes at us, not because they had not been sumptuously entertained here, but to afford them an opportunity to display their small wits. Thus Chicago water became the butt for jokes all over the country, to the no small mortification of its citizens, who were doing all in their power to ameliorate the evil, and who would gladly have done so long ago, at any expense.

This had been the precise condition of Chicago since it arose from the prairie to be the largest city in the western world. It was blessed with commerce; with unequalled resources and avenues of wealth; with railroads running to it from every quarter of the country, draining the bounti-

fully yielding prairies, and pouring their products into its graneries and storehouses. Emigration flowed towards it with unchecked tide. Its people grew rich, its schools numerous; its magnificent churches could be counted by scores; its fine public buildings and private residences astonished the world. Its population increased to more than 250,000 souls. And Chicago was great, prosperous and happy, with the sole exception that it lacked the one great essential to vitality, to life itself and the life of its citizens,  
—PURE WATER.

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### AGITATION OF THE WATER QUESTION.

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This state of things was endured quite submissively until the year 1863, when the citizens began to show a determination to have it ameliorated in some manner or another. The war was in progress, and the nation was too much excited for anybody to think of much else. Engineers, men of mind and ability all over the country, were turning their attention to the field. The pencil of the draughtsman was busy in outlining fortifications, bridging rivers and outwitting the rebel foe. The all-absorbing topic was the war. Men of wealth opened their purses and gave to the common cause; patriotic ladies and children did their best to help it to a triumph. The prospects were indeed poor for any great outlay in any other direction. But still the local agitation was kept up, until finally different parties began to submit plans and specifications for purifying the river.

Many of these devices were Yankee in the extreme, and not a few of them almost provoked a laugh. Perhaps the most elaborate of any was that prepared by Mr. Gindele, of the Board of Public Works. He suggested that the waters

of the Calumet and Desplaines rivers be diverted into the Chicago river, by means of the feeder and the use of pumps. To this it was objected that the supply of water would be inadequate, while the adoption of the plan would involve the city in interminable and expensive chancery suits, the diversion of the current of the streams and of the canal seeming necessarily to encroach upon rights which had vested in the canal company, and in the owners of mill property and water privileges on the canal and on the running streams.

A second plan suggested was, to build a series of intercepting sewers, similar in their nature to those which have lately been erected in the city of London, for the purification of the river Thames. These, it was thought by some, could be constructed along the margin of the river, as reservoirs for the filth passing within its borders and from the sewers, the contents thus received being emptied into the lake, or distributed over the country for purposes of agriculture. This suggestion had a theoretical value. The largest city of the world adopted it, at an enormous expense, but to the time of its consideration here, no results had been deduced which would warrant a certainty of probable success. The expenditure of money would be very great, and the loss of time would be considerable, and on so great an experiment, which had not in itself a fair prospect of success, our people were unwilling to enter.

The proposed ship canal had the appearance of being something feasible, but there was a barrier to its success. It needed congressional legislation, and to procure the necessary number of votes, the assent of Western Congressmen was asked to have four distinct lines of railroad communication to be built at the expense of the nation. Less than a canal could not be thought of, because citizens of towns upon the line and upon the river bank would be ill content to receive the surfeit of our surplus nastiness.

A covered aqueduct was also proposed. This it was thought should be of the diameter of ten feet, to extend from

the lake to the river, which it should enter at some point on the south side, a point at about Sixteenth street being designated. To this plan it was objected, that the obnoxious matter being emptied into the lake so near the point whence the lake water would be drawn, it would be corrupted and increase rather than diminish the evil complained of.

About this time the ship canal bill was killed, a result feared by many of our citizens. It deprived them of all hope of relief in this direction, and gave an impetus to the Tunnel project, which shortly afterwards gained great favor among all classes. Every scheme as yet presented had proved untenable, and the desired end—that of providing an abundance of pure water for Chicago—was quite as far off as ever. Only one point had been gained, and that was, the people had now become thoroughly aroused on the subject. The grand result shows what popular will and determination can accomplish.

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## A TUNNEL UNDER LAKE MICHIGAN.

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The inventive genius of our citizens, and particularly of the different members of the Board of Public Works, was now thoroughly aroused. Western determination was at work, and Teutonic pluck was resolved to unloose the bulldog's grip. We had plenty of pure water constantly in our view, tantalizing as the fact may appear. It was true that Lake Michigan was quite as foul as the river, near its mouth, but at a certain distance from shore the water became as pure as Croton, cold and clear as crystal. The contaminating influences of the Chicago river possessed no power over the waters of the lake, at a distance of two miles from shore. Here, then, was an eternal reservoir, from which

Chicago could derive pure water in abundance, long after the masonry of the Croton aqueducts should crumble. It was a glorious idea in embryo. How could this natural supply of water be appropriated and made to flow through the miles of pipes and numberless hydrants of the city? The water, to insure its constant purity, must be drawn from the lake, at a distance of at least two miles from shore, far beyond the murky influx of the river and the city sewers. It was a great problem, worthy of the mind of genius. And it was solved. Chicago possessed a mind and a man equal to the gigantic task.

To Mr. E. S. Chesbrough, the skillful and accomplished city engineer, belongs the credit of the original idea of constructing a tunnel, two miles in length, beneath the bed of Lake Michigan, which should literally tap the lake from the bottom, at that distance from shore, and through which pure water should be conveyed into the reservoirs of the city. No sooner had Mr. Chesbrough conceived the idea of a tunnel, than he proceeded to investigate the subject. He soon determined, in his own mind at least, that it was entirely feasible, and prepared plans for its construction, into which the other members of the Board of Public Works entered with a will.

When the news became known that Chicago proposed to build a tunnel two miles under Lake Michigan, far beneath its bed, and then tap the bottom of the lake at that distance from shore, to secure a supply of pure water for its inhabitants, the entire civilized world were astonished. New York declared it could not be done; New England affirmed, in Puritanic style, that it should not be. They said, in their peculiar language, that no city but New York and Boston had any right to drink pure water. Chicago, they more than once hinted, would bankrupt herself if she undertook such a "wild job." They could not bear the idea of such enormous expenditure. Besides, such a project, by its very boldness, would draw thousands of visitors to Chicago, to whom they

preferred to show the Boston Common, the big organ and Central Park. Both those cities pronounced against the Lake Tunnel, and their newspapers endeavored to show by long leaders that the project was a vain chimera.

But Chicago had got a brilliant idea, through the active brain of Mr. Chesbrough, who has ever been her faithful servant, and whom her citizens will never cease to hold in grateful remembrance, as much for the rare fidelity with which he discharges his official duties as for the unassuming modesty with which he leaves the public to the recognition of his services. The popular verdict was pronounced, that it should be seized upon and put into execution. The circumstances required energy and prompt action. It was resolved at all events that water should be taken from the lake, at a sufficient distance from the shore to insure its continual purity.

On the 13th day of February, 1863, the amended city charter was approved, in which power was given to the city "to construct such aqueducts along the shore of Lake Michigan, or in the highways, or elsewhere in said Cook county, and to construct such pumping works, breakwaters, subsiding basins, filter beds and reservoirs, and to lay such water mains, and to make all other constructions in said county, as shall be necessary in obtaining from Lake Michigan a sufficient and abundant supply of pure water for said city ;" "to extend aqueducts, or inlet pipes, into Lake Michigan, so far as may be deemed necessary to insure a supply of pure water, and to erect a pier or piers in the navigable waters of said lake, for the making, preserving and working of said pipes or aqueducts."

Congress sanctioned this action of the Illinois State Legislature, January 16, 1864.

And so the Chicago Lake Tunnel became a tangible thing.

## EXAMINATION OF THE BED OF LAKE MICHIGAN.

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Soon after the action of the State Legislature, but before its sanction by Congress, the bed of the lake was examined, with a view to test the feasibility of excavating the Tunnel. In the month of June, 1863, the City Engineer, with some scientific aid, commenced boring to ascertain the nature of the bottom. The experiments were made first at some twenty feet from the shore. At about two hundred feet from the shore, the water being a little over twenty feet deep, there was blue clay underlying a sandy covering. These experiments led to others. Two scows were towed into the lake and secured by anchors. From between these a two-inch gas pipe was lowered until it rested on the surface of the earth, the top being two or three feet above the surface of the water. Down this tube an augur was passed, both being capable of being lengthened by screwing additional parts to each. At three-quarters of a mile from the shore, the water being twenty feet deep, there was found a four-inch covering of sand and thirty feet of blue clay. One and three-quarters miles out, the water being thirty-one feet deep, the same substratum was discovered. Two miles and a quarter due east of the Water Works, near the site of the crib as at present located, the water, being thirty feet deep, was clear and cool. The earth was penetrated to the depth of thirty feet. Here was found a covering of sand and soft, mashy clay, with a clay becoming more hard and compact as it was sunk into. On June 16th, of the same year, the temperature of the water began to be tested. Its clearness was apparent, a small object being visible at a distance of eighteen feet, the water being thirty-six feet deep. On the



surface, the thermometer showed, at three o'clock of the 16th day of June, sixty degrees, and at the bottom fifty-one and a half degrees. These experiments continued to be carried on with the like result of exhibiting a clay substratum, the approach to the shore, however, showing a deeper alluvial deposit, composed mainly of sand.

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### AWARD OF THE TUNNEL CONTRACT.

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The result of the above experiments was the adoption of Mr. Chesbrough's idea of building a tunnel under the lake, which they demonstrated to be entirely practicable to the minds of the engineers. The old methods of purifying the river, the compound sewers, ship canals, windmills, etc., were at once abandoned; and it is said that the Board of Public Works occasionally laugh at their own folly, in once entertaining such plans, now that the correct one has been found. But it was only through such inquiry and examination—research deep and long—that the proper plan was at last obtained.

The necessary drawings and specifications were now prepared, under the never wearying eye of Mr. Chesbrough. Advertisements for bids for building the CHICAGO LAKE TUNNEL soon astonished the world, appearing in all the Chicago papers, and, as we believe, the New York dailies. Several letters containing "sealed proposals" or bids were soon received, which were opened on the 9th of September, 1863, in the presence of the Board of Public Works and nearly all of the several parties proposing.

The bids were seven in number, and ranged very wide of each other, as follows:

James Andrews, of Pittsburg, Pa.....	\$239,548
Dull & Gowan, of Harrisburg, Pa.....	315,139
Walker, Wood & Robinson, of New York.....	315,000
Williams, McBean, Brown & Nelson, of Chicago.	490,000
Henry Nash, of Chicago (per lineal foot).....	40
D. L. De Golyer, of Chicago.....	620,000
William Baldwin, of New York.....	1,056,000

The question will be asked, why this disparity of bids? It arose from the fact of a difference of opinion existing among the different parties offering the proposals, as to the character of the soil beneath the lake. Some of them claimed that they would meet with sand or gravel in the work of excavation, which would render it both difficult and dangerous; while others argued that the soil would be uniformly of clay and easily tunneled.

Messrs. Dull & Gowan, of Harrisburg, Pa., gentlemen well known in the engineering world, although not the lowest bidders, were the only parties who made an unqualified proposal, taking all risks of soil, etc., upon themselves, and consequently the contract was awarded to them.

On the 5th of October, the following month, the Common Council of Chicago granted all necessary authority for building the Tunnel, so far as they were concerned, and ordered that the requisite bonds be issued.

The contract for this gigantic work, pronounced by engineers of both hemispheres to be the greatest the world ever saw, and beside of which the tunneling of the Thames was mere child's play, was signed and sealed on the 28th day of October, 1868. This paper, which bound the contractors to undertake and complete the greatest project ever entered upon by men, and the city of Chicago to pay them for the same, together with the penalties of failure by either party, bears the signatures of James J. Dull and

James Gowan, the contractors, and J. G. Gindele, Frederick Letz, O. J. Rose, and E. C. Sherman, Commissioners of the Board of Public Works, and specifies the completion of the work "on or before the first day of November, A. D. 1865." As will be seen hereafter, the time fixed for the completion of the work proved to be far too early. It was destined to be the work of years.

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### GROUND BROKEN FOR THE TUNNEL.

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A delay of about two months in the casting of the huge cylinders for the shore shaft of the Tunnel, at Pittsburg, Pennsylvania, postponed the inauguration ceremonies until the 17th of March, 1864, on which day the first shovelful of earth was removed. These ceremonies were of an interesting character, every man participating in them feeling aware of the great undertaking upon which they were entering, and the disgrace which a failure would bring both upon themselves and the city. The ceremonies were witnessed by about a hundred gentlemen, among whom were Mayor Sherman, Messrs. Letz and Rose, of the Board of Public Works, Mr. S. S. Hayes, the City Comptroller, Messrs. E. S. Chesbrough, U. P. Harris, and a majority of the members of the Common Council. The Mayor made a few remarks appropriate to the occasion, and then took the pick and broke the ground, amid the cheers of the company. Each of the gentlemen took a shovelful of earth and placed it in the wheelbarrow, which was taken away by Colonel Gowan, one of the contractors. The field was then abandoned to Messrs. Dull & Gowan, and the work placed in their hands; the Board reserving the right to examine and criticise the operations as they progressed.





DESCENDING THE SHORE SHAFT.

The location of the shore shaft was on the site of the old pumping works, at the east end of Chicago avenue, directly on the lake shore, about half an hour's walk from the Court House.

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## SINKING OF THE SHORE SHAFT.

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Messrs. Dull & Gowan, the contractors, now entered zealously upon their great enterprise. A shaft about nine feet in diameter was sunk, on the above site, a short distance from the shore of the lake. When the workmen had descended a short distance into the earth, they encountered a bed of shifting quicksand, which for a time defied all efforts at excavation. It was originally intended to construct the shaft wholly of brick, running it down from the surface of the ground, to a depth of fifteen feet below the level of the bottom of the lake, but encountering the quicksand compelled the abandonment of this method. The contract was consequently deviated from, and the contractors were authorized to run down an iron cylinder of the same dimensions as the center of the crib, as far as the bottom of the sand bed, about twenty-six feet. This inlet cylinder is nine feet in diameter, inside, and two and a quarter inches thick. It is cast in four sections of about nine feet in length. The great labor of sinking these sections will be apparent to all. From the bottom of the cylinders, twenty-six feet, the shaft was continued into the earth until it reached the depth of sixty-nine feet, being constructed of brick from the point where the iron cylinders ceased.

This shaft is not unlike an immense well. It was destined to be the great highway through which the clay excavated from the Tunnel proper should be conveyed to the

outer world, and much satisfaction was felt by the contractors when this bare commencement of their great work was accomplished.

Over the mouth of this shaft, a rough, temporary building was erected, large enough to contain a steam engine of great power, the office of the contractors, and the brick, cement, tools, etc., used by the workmen. An elevator was now constructed, which carried the miners up and down the shaft to their work, being propelled by the engine. Stepping upon this platform, half a dozen hardy miners, carrying each his little lamp, pick and shovel, would descend far beneath the view of the spectators, to their labors in the bowels of the earth. The clay which they excavated was brought up the shaft in the same manner, and the brick, cement, etc., carried down.

At the bottom of the shaft water soon began to ooze in, and it became necessary to construct a pump, which was worked by the engine, and which kept it dry.

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## EXCAVATING THE TUNNEL PROPER.

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At the depth of sixty-nine feet the workmen stopped, and the shore "shaft" was pronounced a success. Here began that nice engineering, which one of the editors of the *London Times*, who had visited the Tunnel, pronounced "the greatest of modern times."

The point in the lake where the Tunnel should receive water had already been fixed, by means of soundings, and buoys marked the spot. An imaginary straight line was drawn, which the Tunnel was to follow from the point where it crossed the shaft, which was little less than prolonging a straight line nine feet in length, without deviation, until it

reached some point two miles ahead. The compass, the natural reliance of man upon the lake, could not be relied upon *under* the lake. Local attractions of the earth would render it uselessly inaccurate, so far as giving anything more than a general direction was concerned. The only method of procedure was to run the axis of the Tunnel parallel with the straight line drawn over the lake, which was only observable at the point where it crossed the shaft.

With this, to less scientific minds than those engaged in the great work, frail reliance, the miners struck their picks into the hard clay at the bottom of the shaft, and excavating was commenced directly lakewards. The clay was thrown upon the elevator before mentioned, and drawn up the shaft, while an ingenious apparatus was arranged which carried it off and "dumped" it.

No little difficulty was encountered in making the turn, or point, from the shaft to the Tunnel, but this was finally surmounted, and will ever remain a model of skill in masonry.

With hardened muscles and determined faces the stalwart miners delved in the hard blue clay, which now began to be encountered, as the excavation reached out further and further under the bottom of Lake Michigan. It was a novelty then, burrowing in the earth "beneath the wave," and they went at it with a will, notwithstanding the two miles ahead of them. Could any one of them have realized that, when they should meet to shake hands with the tunnelers from the other direction, his bright-eyed three year old would be grown into a romping schoolboy, and that several years would be added to his own life, it might have discouraged the hardiest of them. The more grasping and far-seeing minds of the engineers and contractors had scarcely *felt* the great work before them, why should the men who knew only that digging all day brought its reward, realize the vastness of the undertaking.

The width of the Tunnel, when bricked up, was decided to



be five feet, and its clear height five feet two inches, the top and bottom arches being semi-circles. Two miners were all that could work upon the excavation ahead of the masons who laid the brick, and they were relieved at regular intervals, so that the work should not stop for a moment. The brick masonry, which followed the miners as fast as they advanced, was eight inches thick, the bricks being laid lengthwise of the Tunnel, with toothing joints, to give it greater strength and durability. Between this masonry and the sides of the excavation, as much of the earth was forced back, as possible. The lower half of the bore was constructed in such a manner that the bricks lie against the clay, while in the upper half the bricks were wedged in between the brick and the earth, thus preventing any danger which might result from the tremendous pressure which it was feared might burst in the Tunnel.

The material used in the masonry was white Illinois brick, of the usual size, laid in cement. The Tunnel was to have a slope from the "crib," or lake terminus, to the shore, of two feet to the mile, to admit of its being emptied in case repairs should at any future time be necessary, the water being shut off by means of gates at the lake end.

In this slow and tedious manner, the workmen made their way under the lake, from fourteen to twenty feet being considered great progress for twenty-four hours, the work being continued night and day. Before they had advanced far from the shaft, the air began to grow impure, and each day the difficulty increased. Here was an obstacle of no small moment to encounter. A large steam bellows was obtained, and placed at the mouth of the shaft, from which piping, not unlike ordinary stove pipe, was run down the shaft, branching off into the Tunnel. This tube was perforated with holes, in such a manner that the operation of the bellows extracted the impure or dead air from the Tunnel, causing pure oxygen to fill its place, which in turn was carried off by the pipe, when it was consumed by the lungs of

the workmen. As the Tunnel progressed, this pipe was lengthened, and thus a constant supply of pure air was obtained.

Soon it became necessary to provide some more rapid means of transporting the earth from the face of the excavation to the shaft. Rails were laid down, and small cars placed upon them. At the commencement these cars were propelled to the shaft by workmen, where they were drawn up, and their contents discharged. But as the distance increased, day by day, and new lengths of rail were added, other means of locomotion were sought. Much to the edification of the laborers, two small mules were purchased, which could barely stand between the walls of the Tunnel without rubbing their ears. After some little schooling, these tractable animals were placed upon the elevator, and lowered into the earth. After a little experience and training, they learned their work, and performed it well.

Several cars at a time were now loaded, and the mules attached, which drew them to the shaft. A regular railroad time table was prepared, to avoid collisions, as it was impossible for any person entering the bore to pass the "down" train, should he be so unlucky as to encounter it in the bowels of the earth. At the shaft, the mules were turned around, and the train of empty cars drawn back. These mules and their long train of cars, presented a very picturesque appearance, each of them wearing a small lamp upon his collar, which served for the calcium light before the engine. This submarine railroading will be further spoken of in another chapter.

When the Tunnel had reached the distance of one thousand feet from the shaft, a sort of chamber or stopping place was made, where the excavation was enlarged, to afford a deposit for the material used, a place to mix the cement, turn-tables for the cars, stables for the mules, etc. These were left at the distance of one thousand feet apart, to be

bricked up when the whole work was completed. The distance was marked upon the inside of the bore, as fast as the work progressed from the shaft, every five feet.

Leaving the miners at their ceaseless toil under Lake Michigan, burrowing further and further from the light of day, where it was one eternal night, still and damp and full of terror for less stout hearts, we will take a look at the other operations of the contractors, and see how they propose to construct the lake end of the Tunnel.

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## THE CRIB, AND ITS SUCCESSFUL LAUNCH.

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Many persons have been fully able to comprehend the Tunnel itself, and how it was constructed; but the process by which water was let into it from the lake has puzzled many wise heads. It was originally proposed to sink from two to four lake shafts, in the form of cast iron cylinders, which were to be protected from the action of the water by cribs built around them, similar to those sometimes used in constructing piers or large breakwaters. But on further examination it was ascertained that these shafts could be reduced to one, which should be sunk at the extreme end of the Tunnel, two miles from the shore shaft.

The "crib," as it has been commonly called, was built on shore, and launched, much like the *Great Eastern* or any other sea-going hulk. It is composed of huge timbers and tons of iron, no expense being spared to make it strong; is forty feet and a half high and built in pentagonal form, in a circumscribed circle of ninety-eight and a half feet in diameter. It was constructed with three walls—the outer, the center, and the inner—making it almost like three distinct structures, one inside the other, and all firmly

braced and bolted together, so as to constitute one great structure. Each of these walls was calked and tarred, like the hulk of a vessel. They were constructed of twelve-inch square timber, the first twelve feet from the top of white oak and the remaining twenty-eight feet of white pine. Each piece of timber comprising either wall was firmly bolted in its place with square rods of iron, one and five-sixteenths of an inch in diameter and thirty inches long. The bottom was composed of twelve-inch timbers, held in place by bolts thirty-six inches in length, passing through three distinct layers of timber. The whole framework was a combination of massive timbers and irons, firmly held together by bars and bolts and braced in every direction. When finished it contained fifteen separate watertight compartments. In the center was a "well," open at the bottom and top, through which the shaft was to descend into the bottom of the lake.

Each angle of the crib was provided with iron armor, to protect it from ice or any other body borne upon the waves. This covering was of iron two and a half inches thick, and covered the structure two feet each way from the angles, and extended downwards from the top twelve feet. This armor was fastened to the outer wall of the crib and the adjacent timbers by iron bolts thirty inches long, and to the inner wall and its timbers by round iron bolts, an inch and a half in diameter and thirteen and a half feet in length.

That people may form a correct idea of this immense structure, and the importance it possessed in the great work, we give a few items of the timber and iron used in its construction. It cost not far from one hundred thousand dollars before it was moved from the stocks. Reduced to board measure, there were used in building it 618,325 feet of lumber, as follows:

538,368	feet	white pine timber.
42,000	"	white oak timber.
20,000	"	two-inch white pine plank.
18,000	"	two-inch white oak plank.

Besides this, there were used five hundred bales of oakum and sixty-five tons of iron bolts.

The immense cost of all these different articles, at the ruling high prices of the war, can hardly be estimated. It forms a large item of the entire expense of the Tunnel. The contractors made no needless expenditure, neither did they omit anything that could add to the strength and durability of their work. So far as possible, the lumber was all procured in the forest, cut and prepared as low as possible, while the iron was purchased at the most reasonable figures.

This immense structure, almost as large as the Chicago Court House, was built like a vessel, on the north pier, a short distance from the mouth of the river. On the 24th day of July, 1865, an immense concourse of people gathered on the spot to see it launched. So great was the interest felt in its being successfully put in position, that merchants left their counting-rooms and hurried to the scene. Thousands of people were present, standing upon the house tops, riding upon the river in yawls, and seated in carriages upon the banks and piers.

The launch was announced to occur at between nine and ten o'clock in the morning. The day was propitious, scarcely a ripple breaking the surface of the lake. From the summit of the crib floated American flags, and the hat of Colonel Gowan was occasionally visible, as he went to and fro, giving orders to the workmen. The river itself presented a lively appearance. Seven tugboats, with flags flying and hundreds of people on their decks, among whom were Governor Oglesby, of Illinois, and many other distinguished men, were waiting in the harbor to tow the monster to its place in the lake.

Shortly after ten o'clock, the leviathan moved, rode slowly into the river, with streaming flags, and the hat of Colonel Gowan swinging over his head from the top. Cannon boomed, hundreds of steam whistles shrieked, bells rang, and thousands of throats cheered lustily. When about in

WORKING UPON THE "FACE" OF THE TUNNEL.





the middle of the river, the mass left the ways upon which it rode, and rose upon the water as gracefully as any craft that ever was launched.

The tugboats now attached their hawsers, and the crib was towed slowly towards the buoys in the lake, which had been placed there to mark its position, on a direct line with the shore shaft. These were reached at two o'clock, P. M., and the hawsers cut loose. The gates of the crib were opened as soon as it was got in position, and it settled majestically into the lake, where it is ever more to remain, a monument of mind over matter.

When the crib was in place it was filled with stone, with the exception of the center compartment, reserved for the lake shaft to go through, and cables were attached to its corners, which were fastened to the bottom of the lake by means of Mitchell's marine mooring screws, never before used except in tunneling the Thames. The screws had previously been imbedded in the bottom of the lake.

Once in its place, this monster crib became an island in the lake. When filled with stones it was as immovable as Gibraltar. Reaching down to the clay bottom, the water being about thirty feet deep at this point, several feet of the structure remained above the surface of the lake. As winter approached, the top of the crib was covered by a house, constructed with a cupola, where a light and a fog bell were kept at night to warn the mariner of his position, which the law now requires the city authorities to constantly observe. Tugboats plied between the crib and the city, carrying out supplies to the workmen and conveying visitors to the wonderful island.

The crib was at last firmly in its place, secure from the storms of Lake Michigan. Tunneling from the shore towards it, in a straight line, was kept up unceasingly.

The next end to be obtained was sinking the cylinders in the crib, in order that tunneling could commence in both directions. The winter of '65 was at hand. A large quantity



of brick and mortar were taken out and piled upon the crib, as well as provisions for the men; it being anticipated that when winter set in, the ice would not permit of reaching the crib for months at a time.

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## THE LAKE SHAFT.

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The "crib" was now in its place, anchored securely in the lake, two miles from the shore shaft. Every day the workmen in the "bore," or Tunnel proper, were progressing towards it, slowly but surely overcoming the impediments in their way, and gradually becoming more inured to their close and somewhat dangerous quarters.

Imagine a score of hardy workmen down in the bowels of the earth, thirty feet below Lake Michigan, burrowing their way to an unseen goal, far, far ahead, and which they knew years alone would suffice to reach. To the timid the situation would be a horrible one. The constant fear of accidents would drive them mad. Every rush of air through the "breathing pipe," from the huge bellows above, would terrify them with the thought that Lake Michigan had broken in upon the devoted band, and would bury them in the deep grave dug by their own hands. At each thud of the pick against the hard clay, they would imagine the earth caving in upon them, and engulfing them in a living tomb. They would conjure up demons in the darkness, and see horrible shapes in the smoke of the lamps. And those same timid people shudder at their own firesides as they peruse these pages. If all the people of Chicago had been of this sort, we should have drank foul water all our days.

The huge iron cylinders which were to form the lake shaft of the Tunnel, were at length got out upon the crib, after

much vexatious delay and expense to the contractors. These cylinders are nine feet in diameter, and the iron is two and a half inches thick. They were cast at Pittsburgh, Pa., in nine-foot sections, their immense weight rendering it otherwise impossible to move them. The end of each section was provided with a heavy flange, through which it could be bolted to the one below it, similarly constructed. These cylinders are seven in number, their respective weight being about eleven tons. The irons used in bolting them together were one and a half inch, cemented as well as riveted in their places.

These immense cylinders once placed upon the crib, the next step was to get them in place in the center compartment of the structure. Mr. Bramhall, one of the engineers, solved the problem, inventing machinery and tackle for the occasion. The cylinders were partially suspended over the chasm in the crib by this tackle, then swung upon ways and supports of timber, in which manner they were at last placed in position and firmly riveted together. After reaching the bottom of the lake, on which the crib rested, being sunk into the clay several inches by its immense weight, these cylinders, or sections of the shaft, were sunk into the ground twenty-seven feet, in much the same manner as the shore shaft was built, at which distance they reached the required depth, leaving a fall of two feet to the mile in a straight line drawn to the bottom of the shore shaft.

A complete shaft in the lake was thus formed, by means of the crib. The drawing on the first page shows it fully, and should be closely examined.

The work now resolved itself into simply this: An island (the crib) is situated in Lake Michigan, two miles from shore, upon which (to draw a homely illustration that all will understand) are confined a number of convicts. There is no means of their escape to the city over the surface of the water, and they resolve to go *under it*. Never dreaming of this trick, the authorities have placed in their hands picks

and spades, with which to till the island whereon they are confined for life. The villains go to work, dig a hole in the island until its bottom is below the bottom of the lake, then strike off for the shore, which they succeed in reaching after years of toil, much to the surprise of everybody. This is the plan of the Tunnel, the crib forming an artificial island where the water is to enter, and pass to the shore, free from the impurities of the river or the city sewers.

An engine was placed upon the crib, to which was attached a pump, similar to the one in operation at the shore end, by which the water was taken from the new shaft as fast as it found its way in from any cause whatever.

Winter was now rapidly approaching and threatening to lock the lake and river in icy armor. Consequently, every means of getting winter supplies to the crib before the river should freeze up, and stop the running of the tugs, was resorted to. A large supply of brick, cement and other material used in making the Tunnel, was taken out and stored in the building upon the crib. It being anticipated that months might elapse before the miners could communicate with the shore, a commissary department was thought necessary, and all kinds of provisions were likewise transported to the crib, in sufficient quantities to satisfy the hunger of a large number of laborers for some length of time. The services of a cook were also procured, a kitchen commissariat fitted up, and everything put in complete order for the winter campaign under the lake.

A visit to the crib just before the harbor froze over, proved interesting in the extreme. The party was composed of aldermen Denio and Marsh, of Boston, Mr. J. B. Stearns, superintendent of the Boston Fire Alarm Telegraph, and several members of the Board of Public Works, and Chicago citizens. Within this "castle at sea" everything presented the appearance of the interior of a well regulated building on shore, while just without the waves of an angry lake were beating with remorseless fury, but which were not able

to even stir the monster artificial island. The steam engine was at work moving heavy stones and timbers into position, workmen were hollowing "heave! ho, heave!" and the dismal creak of powerful pulleys and levers told that a great work was in progress. The Bostonians asked many questions, all of which were carefully answered by Col. Gowan. They expressed many doubts as to the two sections of the Tunnel meeting, but were assured that they would do so to within an inch.

There was something strikingly romantic in the scene, which will never be obliterated from the minds of those present at that time. Fifty workmen living an entire winter in a castle built in the lake, two miles from shore—a little world within a world. The storms and tempests of a large body of water beating around them in every direction, and they busy digging deeper and farther beneath the lake, as if burrowing out of a prison fortress.

Winter at length closed in upon the inhabitants of the crib, almost before they were ready for it, and the tugs ceased to run. The river froze up, and our family of laborers, with one or two officers, were left upon the crib to pursue their round of work, with nothing but the winds to vary the monotony of their existence. Meanwhile the progress of the work was made known to the contractors, and Mr. Offerman, the superintendent, at the shore shaft, by means of signals of different kinds, which had been previously determined upon between the parties. And so the work went on day and night, the laborers coming on duty at regular intervals, while the merry world of Chicago skated, danced, went to the opera, and disposed itself as happily as possible.

The lake shaft being ready, tunneling was commenced from the bottom towards the shore, on the first day of the New Year, 1866. The first brick at the crib end was laid on the 22d day of December, 1865. At that time the shore shaft had reached the length of 4,815 feet. The earth

removed from the face of the Tunnel was carried up the shaft and dumped into the lake, and as it progressed similar appliances to the furtherance of the work were used to those already described at the shore shaft.

Leaving the two mining parties under the lake, slowly approaching each other, guided by skillful engineering, we deviate from the bare detail of operations, go back a little, and narrate the particulars of several visits to the shore shaft.

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## GEN. GRANT'S PARTY VISIT THE TUNNEL.

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Early in July, 1865, Gen. Grant and suite arrived in Chicago, and were entertained for several days by the citizens, making the Tremont House their headquarters. Being invited to visit the Tunnel, an hour was fixed upon for their reception at the "big bore," which had then progressed several thousand feet from the shore.

When the carriages arrived at the works, much disappointment was felt by the non-appearance of the General, who, being indisposed, had declined to leave his room. All the other members of his suite and staff were, however, present, together with several gentlemen who had been invited to make a trip out under the lake. The following are the names of the entire party: Maj. Gen. Wilcox; Maj. Gen. Williams; Maj. Gen. Ord; Hon. G. Chandler; Hon. W. A. A. Baldwin; Capt. Roe, of the U. S. steamer *Michigan*; R. N. Rice, Esq., superintendent of the Michigan Central Railroad; P. A. Hall, Esq.; C. W. Davis, Esq., and Col. Gowan.

Whenever a person went into the Tunnel, he was obliged to prepare for the work before him. Col. Gowan kept on hand

a large variety of tunnel costumes, of the most elegant subterranean designs. He marched the visitors to the clothing room, which consisted of a large chest in his office, and showing them the collection, bade them make choice of their apparel, stipulating that however fascinated they might become with its fit, and their own figure when attired, they must on no account wear away a single article, nor take a shred home with them as a relic of their visit. This being arranged, the major generals were first given their choice of garments. Gen. Ord, who is a tall six footer and rather slim, picked out a corduroy jacket, which came down as far as his hips, and there paused. It sat admirably, the sleeves being a little shorter than his arms, which Col. Gowan assured him was all the rage, Napoleon having worn a similar coat on a recent visit to the great Mont Cenis tunnel under the Alps. Quite Napoleonic looked the general when attired, and he was cheered for his success in tunnel drapery. Next his military hat went by the board, and a *chapeau* of a very slouchy appearance took its place. Rolling up his trowsers he declared himself ready for a visit to China, or anywhere else.

Gen. Wilcox next fixed up, in a very long coat, being a moderately short man. This was a satinet garment, very threadbare from long acquaintance with the Tunnel, and longer with the world. The general looked like farmer Slocum just come to town with a load of vegetables. A palm leaf hat sat jauntily on his caput, giving him a decided Yankee air. Gen. Williams borrowed a coat from a miner, because he thought the coat might know more about the Tunnel than any other, and he would be less likely to go astray from the rest of the party. A dilapidated tile finished his outfit, and he stood before the admiring spectators a veritable tunnel miner.

Senator Chandler is a tall man; very tall. Few old coats will fit him: few new ones do. He was more fastidious in his taste than the rest of the party, and consequently fared worse. A very ragged coat and a very ragged hat were finally

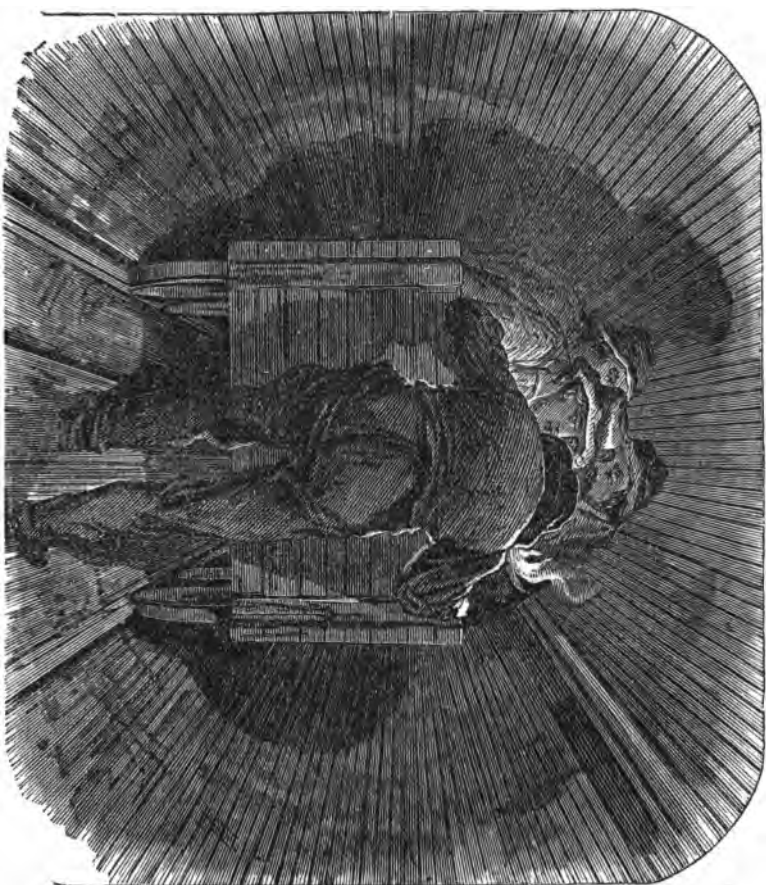
adjusted on him; in what manner hereafter follows: The coat was turned inside out, because the senator began to put it on at the wrong end, and because nobody told him how it went. His hat was caved in, appeared to have a brick in it, and had a constant and inexplicable tendency to gravitate earthwards.

Superintendent Rice, of the Michigan Central railroad, got on a very narrow little cap, something on the clerical style. The coat he wore was once broadcloth, but that was before Chicago was a city. When it was cut there was not a railroad in Illinois; hence the very grotesque appearance of a railroad man in such a garment.

The remaining members of the party attired themselves in whatever was at hand, some turning their coats inside out and tying handkerchiefs over their heads. All in all, a more novel group of explorers was never seen. The men in buckram were eclipsed.

Col. Gowan had prepared three earth cars for the voyage under the lake. These vehicles were about three feet long and two feet wide, and, when used for carrying passengers, were expected to hold four persons. On this occasion they were upholstered with blankets and buffalo robes, and were quite comfortable to travel in. There was not the slightest chance of falling out, because the sides came up to the passengers' heads, when they were seated upon the bottom.

The cars were brought forward, placed upon the elevator, and four persons got into each one. At last as they were filled they descended into the shaft; the explorers bidding adieu to those behind as their heads went down out of sight. When the cars were lowered to the bottom of the shaft, they were rolled off into the Tunnel proper, as they came down, and coupled to each other, like a railway train, on a genuine track extending the whole length of the bore. When everything was in readiness, or, as Superintendent Rice said, when the train was made up, a diminutive mule was attached, and



RAILROADING UNDER LAKE MICHIGAN.





a miner with a little lamp on his hat drew rein over him, gave a shrill whistle, and the train moved off into the subterranean darkness.

"Now we are under Lake Michigan," said Col. Gowan, and the mule was given the whip. Off went the cars at a breakneck speed; into the darkness, into the bowels of mother earth, under the waters of the lake. The rapid motion caused a current of air, which relieved the damp sensations of the place. Imagine a tube, nearly a mile in length, and the size of a carriage wheel, built of solid masonry. Through it a train of little cars are gliding, each one filling up the entire space of the tube. Each car contains four persons—major generals, colonels, senators, etc. The only light is a dim lamp in the hands of the driver, and a similar one on the engine, or the mule. Nobody but the driver, one of the passengers, (Col. Gowan,) and the mule, have any idea where they are going, what they will run against, or where they will fetch up. This will give a little idea of this subterranean and sub-lacustrine journey.

The cars sped along at a remarkably rapid pace. Gen. Ord inquired of Superintendent Rice if he did not think Col. Gowan's "underground" railway compared favorably with the Michigan Central, both as regarded speed, ventilation and convenience. Mr. Rice admitted that the Michigan Central was nowhere; but suggested the only thing he feared was meeting a down train. He also reminded Conductor Gowan that it was quite time to pass through and take up the tickets. Colonel Gowan replied that the road would soon be paying a large dividend annually to the citizens of Chicago, and that they all owned stock in it.

After a journey of fifteen minutes, through a straight dark road, at a cantering speed, the train emerged into the last chamber, which was lighted by innumerable little lamps. The miners looked bewildered at the strange advent, and laughed outright as the parties stepped from the cars, and shook themselves. Col. Gowan announced that they had about

four hundred feet further to traverse on foot, before they got to the extreme end of the Tunnel. Taking a lamp, he led the way. The long men in the party doubled themselves up and followed, and the short men bent their heads very low. "Tramp, tramp, tramp," until backs and legs ached, and at length the extreme end of the Tunnel was reached. About twelve feet was dug into the solid clay, and the miners, who stood about the weird place like so many spectres, were engaged in bricklaying and cementing. Colonel Gowan announced that the party were then 8,400 feet from shore, under Lake Michigan. Bits of the clay were pocketed as trophies, and the party retraced their steps.

The cars were re-entered at the first chamber, where the party left them, and off went the train in the direction of the shaft, at the rate of 2.40 per mile. The mule, which wore no breeching or back strap, suddenly paused, when the train was at its greatest speed. The cars ran upon the animal's heels, and those in the forward car had the pleasure of receiving him into their laps, nearly frightened out of his mulish wits. Col. Gowan, the conductor of the train, got out, and went ahead to see what had frightened the "locomotive." A shout told the party that some joke was in store for them. He returned to the cars with Senator Chandler's hat, which had been blown off and left on the track during the outward voyage. The mule was not used to such a strange sight, and nearly caused an accident to the passengers.

The party soon emerged into the light of open day, and, congratulating each other on the success of the trip, disrobed and put on their usual habiliments. After shaking hands with and thanking Col. Gowan for his kindness, they got into their carriages and drove back to the Tremont House, well satisfied with their trip into the bowels of the earth, and under Lake Michigan.

## BOSTONIANS VISIT THE "BIG BORE."

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A few weeks after the above excursion, Chicago had the honor of entertaining a delegation of aldermen and other city officials from the "hub." Of course they must see the Tunnel, and a journey under the lake was put upon the programme, especially as the guests all requested it, saying that it was one of the principal things they had come to see. The party were the same that visited the crib, in a former chapter.

Arrived at the Water Works, the Boston men were all anxiety concerning their expected adventure, not caring to be killed outright in Chicago, as they seemed to fear they were going to be. But they were told that many illustrious gentlemen besides themselves had gone down into the Tunnel before them, and returned to the outer world alive. Lieut. Gen. Grant's staff officers and a large party of gentlemen descended into the Tunnel in July, and Sir Morton Peto's party also paid a visit to the "big bore." Where such gentlemen had been, the heroic firemen and aldermen of the "hub" could certainly go with impunity and profit; and so it was decided to undertake the subterranean and sub-aqueous journey.

The first step previous to the descent was examining the hoisting machinery, and the apparatus by means of which the air in the Tunnel was kept pure. Everything was fully explained by Col. Gowan, who took pains to carefully elucidate every point and answer every question. The machinery was beautiful in the extreme, the hoisting machine being almost noiseless in its revolution, and perfectly under the control of the engineer. It was so arranged that in case of an accident it could be stopped in an instant, midway of the

descent. The immense bellows which created a current of pure air in the Tunnel, was also examined, as a point of especial interest.

The next thing was to get ready for the descent. Aldermanic broadcloth, fresh and glossy from the looms of Lowell, could never survive contact with the clay of Lake Michigan. Col. Gowan again drew on his wardrobe, and produced several complete suits of exploring garments. Ald. Marsh attired himself in a very jaunty suit, mostly of cast-off corduroy; and when he was dressed looked quite as much like an Indiana Hoosier as like a modest alderman. Alderman Denio was less fastidious, and turned his coat inside out. Tying a pocket handkerchief over his wise head, Alderman No. 2 was ready. The gentlemen of the Boston and Chicago Fire departments displayed much skill in their drapery. Their quaint "get up" excited much remark, and jesting upon personal matters was brisk. All in all, a more novel-looking half-dozen of explorers never prepared to visit the crater of Vesuvius. Seen by the faint glimmer of the miners' lamps, they looked like conspirators,—and yet half of them were citizens of Boston!

"Hoist away," cried the man in charge of the elevator at the shaft, and the next moment Aldermen Marsh and Denio, and a miner with a little lamp upon his cap, were rapidly descending the shaft. Those left on *terra firma* gathered around the opening in the earth, and gazed after the glimmering light as it slowly went down into the bowels of mother earth; for the lake roared and tossed half a rod away, and those accompanying the taper were going beneath its waves and foam. Forsaking the sublime for the ridiculous, a wicked fellow above remarked that it was an "awful lowering of aldermanic dignity, which provoked a laugh that rang out clear upon the night air. Luckily for his head the members of the Boston city government were out of hearing.

Depositing its passengers at the bottom of the shaft, the elevator was drawn up, and the lesser lights of the party

began the descent. Once upon the bottom of the shaft, which is eighty-nine feet in depth, the Tunnel proper was seen branching off under the lake like a long tube. In the little chamber where the expectant party was standing, was noticed a train of three small cars, which had been prepared to convey them out under the lake.

A diminutive mule was attached to this train, and the gentlemen seated themselves like Turks upon their curled-up legs in the bottom of the cars. One man in each car was given a small lamp, and one was hung upon the mule's collar. The driver's whip was applied vigorously, and away went the train, aldermen and all, under Lake Michigan. The Tunnel is five feet in diameter, a perfect cylinder, and just large enough to admit of the passage of the cars. Whoever raised his head above the sideboards would be sure to lose his hat, and a portion of his scalp.

Along the Tunnel ran a pipe, something like a stove pipe, through which the bad air was extracted from the extreme end. As the work progressed, this pipe was extended. The only caution necessary on the railroad excursion under the lake, was to keep one's head clear of the pipe, which all succeeded in doing. Every thousand feet the travelers arrived at a chamber, where the miners mixed their cement and mortar, and where cars were turned around on turntables. As you went down into the bore, or further out, the number of feet you had progressed under the lake was marked upon the masonry in plain figures.

Much joking was enjoyed as this singular train of cars passed further and further under the lake. No one could raise his head beyond a certain height, and could scarcely move. The mule trotted along briskly, and the current of air created by the motion was quite strong. The gentlemen from the "hub" were dumbfounded by the singularity of their situation. What if water should find its way into the bore, from the foaming lake above. In such a case the descendants of Plymouth Rock would never return to the

harbor where the *Mayflower* dropped anchor. It was horrible to think of, and of the bereaved Bostonians. For the nonce all seemed to obey the mandate written over the entrance to Dante's purgatory, "All hope abandon ye who enter here." But we are at the last chamber.

The cars could go no further than the last chamber, and the party alighted. Here they found men engaged in mixing mortar and cement, by the light of little lamps hung upon sticks stuck in the clay. Two hundred feet yet remained to be traversed before the extreme end could be reached. The miner who conducted the party led the way with a lamp, and the several gentlemen followed on foot. Men of ordinary stature were obliged to stoop almost double, so the last part of the journey was where the romance came in. At length the extreme end was reached—nearly a mile from the shaft.

Here all was busy labor. The sharp click of the trowel, and the dull sound of the miner's pick as it was buried into the compact clay, met the ear. The smoke from a dozen fluid lamps floated off into the long, tube-like bore, casting weird shadows over the scene. Clambering over a pile of clay, awaiting transportation to the shaft by the next train, the party reached the miners. Here two stalwart men, with breasts bared and brawny muscles uncovered, were striking herculean blows against the earth before them, which yielded reluctantly, and crumbled. The air here was extremely bad, caused by the number of persons breathing it and the smoke from the lamps. The miners looked like grim spectres, as they plied pick and spade and trowel. For a few moments the visitors gazed awe-struck upon the inhabitants of the subterranean world. One miner said that he had been there every day for nearly two years; and so his sallow countenance, and sunken, almost unearthly face indicated.

In the excavating process jets of gas were frequently struck, which delayed the work, and were difficult to surmount. One week several such jets were encountered, and much delay occasioned. The miners could always tell by the

sound of their picks when such a jet was being approached. When within a few feet of it they bored through the clay with an auger, and when the jet was reached, one miner pulled the instrument out, and another lit the jet with his lamp. In this manner a natural gas light was produced, sometimes lasting several hours. When the gas was encountered in large quantities it drove the workmen from the Tunnel. To avoid accidents when working new gas jets a safety lantern was used. Few stones were met with. When found at all, they did not seem to lie in any geological order, or range in any particular direction, or strata, but lay in groups of four or five, as if thrown together by the action of the waves at some remote period. When granite was found, it appeared polished, as if having been under the same influence.

The Boston men evinced a desire to lay a brick in the great Chicago Lake Tunnel, thereby immortalizing themselves, and, more particularly, that they might tell of what they had done. So an obliging miner arranged the cement, and the aldermen each deposited a brick, leaving a greenback in the itching palm of the accommodating but greedy workman. Bits of the clay were carefully picked up and pocketed as *souvenirs*, and the tired party of explorers retraced their steps.

"Good evening, gentlemen," said each of the miners as the party left, showing that good manners may exist under ground when they do not above.

Returning to the first chamber, the party re-embarked on the cars, and were soon at the shaft. The elevator placed them upon *terra firma* in a few moments afterwards, all safe and sound. On examining watches, it was found they had spent an hour and a half in the Tunnel.

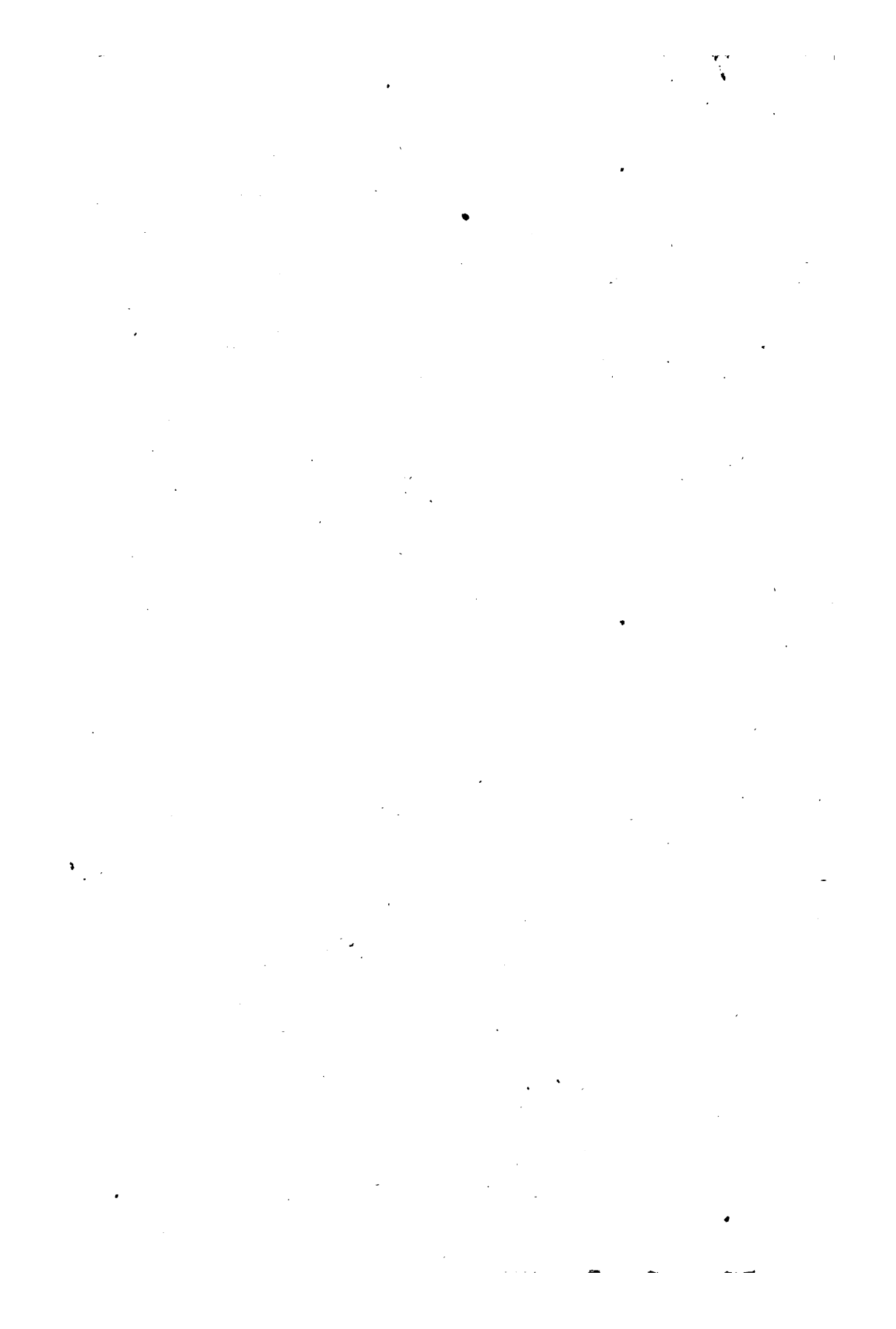


## SIR MORTON PETO AT THE TUNNEL.

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When Sir Morton Peto and party visited Chicago, the lake Tunnel was one of the first sights they requested to see. After a drive through the city, these distinguished foreigners were taken to the Water Works, where, unfortunately, they did not find Col. Gowan. The superintendent would not consent to the party entering the cars and going out where the miners were at work, as he stated that an earth train was then about leaving the face of the Tunnel, and the party would be sure to encounter it. He, however, did all in his power to explain the work to the visitors. They were lowered to the bottom of the shaft, each one being provided with a small lamp, to enable him to examine more closely the masonry and note the dimensions of the bore. Sir Morton evinced the greatest interest in the work. Taking a lamp he ran off into the Tunnel until quite beyond the hearing of the remainder of the party, seemingly desirous of seeing all that was to be seen. He expressed an earnest wish to go to the further end and witness the work in progress, but was told that it was nearly a mile there, and reminded that the "down train" was almost due. The Englishmen took full notes of the work in their diaries, and carried across the Atlantic with them more knowledge of the lake Tunnel than is possessed to this day by half the people of Chicago.

It was intensely gratifying to see these far-sighted Englishmen, with ideas enlarged by the most liberal travel, taking so much interest in the Tunnel. Sir Morton did not hesitate to pronounce it a greater work than the tunneling of the river Thames, yet that required the work of half a century, and was several times entirely abandoned before





THE TURNABLE IN THE TUNNEL.

being brought to completion. It could not even be compared to tunneling under the river at Washington street, for the passage of street cars and other vehicles, now likewise in progress.

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## SCENES AND INCIDENTS IN THE TUNNEL.

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It can easily be imagined that while the miners worked day and night, week after week, month after month, year after year, down in the bowels of the earth, directly under a large and ever restless body of water, that scenes and incidents occurred which would interest the world above ground, could they all be related with any sort of accuracy or coloring that would do them justice. The conversation carried on between the miners and bricklayers was often interesting in the extreme. Now and then it would be varied by the ludicrous joke of some stalwart son of the Emerald Isle, whose broad grin was scarcely visible through the gloomy smoke from the lamps. Conjecture was freely indulged in, and many were the surmises in either section of the Tunnel as to how the other party got along, and how they managed to enliven their dismal work. So entirely had the workmen on the shore Tunnel been kept to their labor, that few if any of them ever saw the crib, or had much of an idea concerning it. They were the tools in the hands of more skillful workmen—dug where directed, and asked few questions as to the result. Some of them were quite as contented to earn a living under Lake Michigan as anywhere else.

One of the miners once stated to the writer that none of them were ever entirely without fear. Their situation, the terrible darkness which always surrounded them, the weird shadows of the place, the impossibility of escape should the

earth cave or a crevice be opened with the lake, which would instantly submerge them—all these never left their minds. The superstitious were easily able to conjure up all kinds of infernal demons in the narrow passage they left between themselves and the outside world as they advanced, and many were the times these men fell on their knees to ask for aid from above, as some unusual sound or occurrence reminded them of their exact situation, and that they were wholly at the mercy of the natural influences of the place. In this sub-lacustrine abode, so full of romance, thought and apprehension, where the full power of nature was visible, these invaders of her solitude cowed before the horrible thoughts which, in spite of themselves and their work, would arise. Confine a hardened criminal in such a cell, let him fully understand that but a wall of clay keeps the waters of the lake from drowning him, that, should the bellows at the shore end of the Tunnel cease to perform its rapid revolutions, his lungs would refuse to receive life from the close and confined atmosphere, and he would repent his sins in an hour. The horrors of the Inquisition would be weak in comparison.

Veins of natural gas were frequently encountered by the miners, which often proved dangerous in the extreme. Becoming somewhat accustomed to these freaks of nature, they at length began to treat them uniformly and with success. The sound of their picks as they struck them into the clay ahead, on the face of the excavation, told them when they were approaching a vein. When within a certain distance of it, they bored into the earth with a sort of auger, pulling it out the instant the vein was struck, and applying their lamp. The gas would instantly ignite, burn with a bright, clear flame, which lit up the Tunnel for a long distance with a fitful glare. Some of these jets would burn several hours, obliging the workmen to leave the Tunnel, and await the extinction of the vein, when they would again proceed as before.

One day, while Col. Gowan was showing a party of visitors into the Tunnel, they distinctly heard the paddle wheels of a steamer, which just at that moment passed directly over their heads, on the lake, showing that the water and the earth were both good sound conductors. Returning to the outer world, they descried the vessel steaming her way towards the harbor. The workmen frequently reported hearing similar sounds.

In September, 1865, a crevice was struck, through which water began to drip into the Tunnel. The frightened miners fled in dismay, but soon returned, repaired the crevice, and proceeded with their work.

It is somewhat wonderful that during three years of tunneling no accident occurred of any moment, or which delayed the work more than a few days at the furthest. The beds of quicksand, prognosticated by some, were never found.

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## PECUNIARY DIFFICULTIES.

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The history of nearly all great enterprises has been embarrassments in more ways than one. It has been said that money would remove mountains, which nobody can doubt, since the completion of the Lake Tunnel. It was not expected that such a gigantic work could be done for anything less than a mine of gold; neither did anybody suppose that such a job could be accurately figured upon in the office of the Board of Public Works. The great disparity in the bids put in by different parties, which ranged from \$239,548 to \$1,050,000, is evidence enough of the assertion. The varying state of gold, the prices of labor and material, rendered it still more difficult to tell what the work would cost. The labor market undergoes many changes in three

years, which has been the case since the Tunnel was commenced. The contractors also claim that they expected to use the clay for making brick for the masonry, but that it was not fit for the purpose, and they consequently lost a large amount of money.

The contract price of the Tunnel was \$315,139, with the allowance of a few insignificant extras. For that amount the contractors believed they could complete the work, but speedily complained that the compensation was not adequate. According to the contract, it was agreed that monthly estimates of the work would be made by the Board of Public Works, during its progress ; and that seventy-five per cent. of the amount should be paid to the contractors from time to time ; the remaining twenty-five per cent. being retained by the Board until the completion of the work, as security for the faithful performance of the duties of the contractors.

The first application of Messrs. Dull & Gowan was for a simple advance of money ; and this request the Council granted, by reducing the amount of monthly estimates reserved by the Board of Public Works from twenty-five to fifteen per cent.

Subsequently, in the fall of 1865, the contractors petitioned for an increase of the contract price, claiming that they took the work when gold was 1.25. When, however, the contract was signed gold was at 1.60 ; and although it has been higher since, it has also been lower. The price of material has certainly been higher ; but, then, it was claimed, on the other side, that the contractors went in with their eyes open, and could have contracted for all the material at the low prices.

The question was referred to the Committee on Finance of the Common Council, who, on the 12th of February last, presented a long and carefully compiled report, amounting to nothing, save the recommendation that the subject be again referred to the Board of Public Works for further investigation. On the 19th of the same month, after a sharp

contest in the Council, an ordinance was passed, by a vote of eighteen to eleven, giving to Messrs. Dull & Gowan, in addition to the sum of \$315,139 named in the original contract, the further amount of sixty per cent. on said contract price. This addition amounted to about \$189,000. On the 5th of March, this ordinance was returned to the Council without the approval of the Mayor, for the reason that it had not been drawn by the law officer of the city, and was in violation of the charter. The Council then passed an order, advancing the contractors the sum of \$50,000, said sum to be deducted from the moneys due said contractors upon the completion of the work.

Up to March 31, 1864, there had been expended upon the work \$2,919.63; up to March 31, 1865, \$106,389.24; and up to March 31, 1866, \$230,220.08—amounting in the aggregate, up to last date, to \$339,528.94. Whether or not the contractors have made money out of the job will probably not soon appear, and the matter of further compensation lies between themselves and the city authorities. The press of the city has uniformly argued that no advance should be allowed the contractors, while the Board of Public Works have seemed inclined to concede to their wishes. It is understood that memorandums of the cost of the work have been carefully kept, and a proper adjustment of the matter will no doubt be made. The great question has been, would the Tunnel prove a success? which has been satisfactorily answered.

When completed, the entire expenditure will not be far from six hundred thousand dollars. And this the city of Chicago is willing and able to pay. PURE WATER was to be obtained at any expense. Tax-payers will not find fault, when the pure, life-giving fluid of Lake Michigan pours through their hydrants, instead of the slimy, polluted mixture of all manner of filth, which they have been accustomed to use so long.



## THE TUNNEL COMPLETED.

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On Saturday, the 24th of November, 1866, the morning papers informed the citizens of Chicago, that the two sections of the Tunnel had progressed so near to each other, that but a thin wall of clay remained to divide them. The glorious result sent a thrill of joy to every heart, and the telegraph carried it to every quarter of the globe. The long anticipated time had arrived—the vexing question as to whether the two mining parties would meet, or, from some slight error of the engineers, pass by each other, and continue on tunneling at random, was answered. When it was further announced that the sections had met each other to within the space of an inch, wonder at the grand result took the place of joy. It was the topic on every tongue, and had the authorities but hinted at a celebration, the city would have resounded with the booming of cannon and ringing of bells. But it was thought best to postpone the grand jubilee until water flowed through the Tunnel, as months of work remained to be done, before the final result would be obtained. The work on the Tunnel was comparatively nothing; it was inception and the daring which determined to carry out the idea to a successful result, which are among the wonderful. The confidence in the ability to burrow two miles out under the lake, and then come up to the surface in deep water, was of that sublime kind which assimilates it to that faith which removes mountains. The work might have been difficult, but it was not so; it was unexpectedly easy, and while two or three cribs were dispensed with, a vast amount of propping which had been calculated for was found to be unneeded.

Remarking on the difficult engineering, and its success, the *Tribune* observed, the morning after it became known

that the two sections had nearly met: "Yes! There was one difficulty in the work—the meeting. Just think of the difficulty of starting out blindfolded, to run a mile and a half in one direction, and to engage to meet full butt another man who would start two miles off with the same intent. Try to fire off two cannon balls so scientifically as that they shall meet in mid air. Even these are easy, compared with the task set for the engineers of that gigantic undertaking, whose virtual end is already chronicled. "How was it done?" is the question which is now being asked by hundreds, who have full faith in the old maxim, that "everything is easy when you know how." Scarcely so. We opine that when this mode of procedure shall be comprehended, the wonder will rather increase than diminish, and the almost superhuman character of the task be only then fully realized.

The measurement of the Tunnel, as it then stood, was as follows:

	FEET.
Whole length of Tunnel.....	10,587
Excavated on Shore Shaft.....	8,275
Excavated on Lake Shaft.....	2,290
Remaining.....	2

Towards evening, the last day of November, the contractors, Messrs. Dull & Gowan, Mr. E. S. Chesbrough, the original "inventor" of the Tunnel, together with his assistant engineer, Mr. Offerman, the superintendent, and a number of miners, dividing themselves into two parties, descended the respective shafts of the Tunnel, for the purpose of removing the thin wall of clay that yet remained between the two sections. The party that descended the shore shaft arrived at the scene of operations first, the others having to traverse two miles of the lake on board a tug, then descend the crib shaft, and go out to meet them. When the appointed time, twenty minutes to four o'clock, arrived, the

picks were raised, and soon the barrier was removed, rendering the great Lake Tunnel one continuous tube, two miles in length and five feet in diameter, reaching from the shore to the artificial island in the lake.

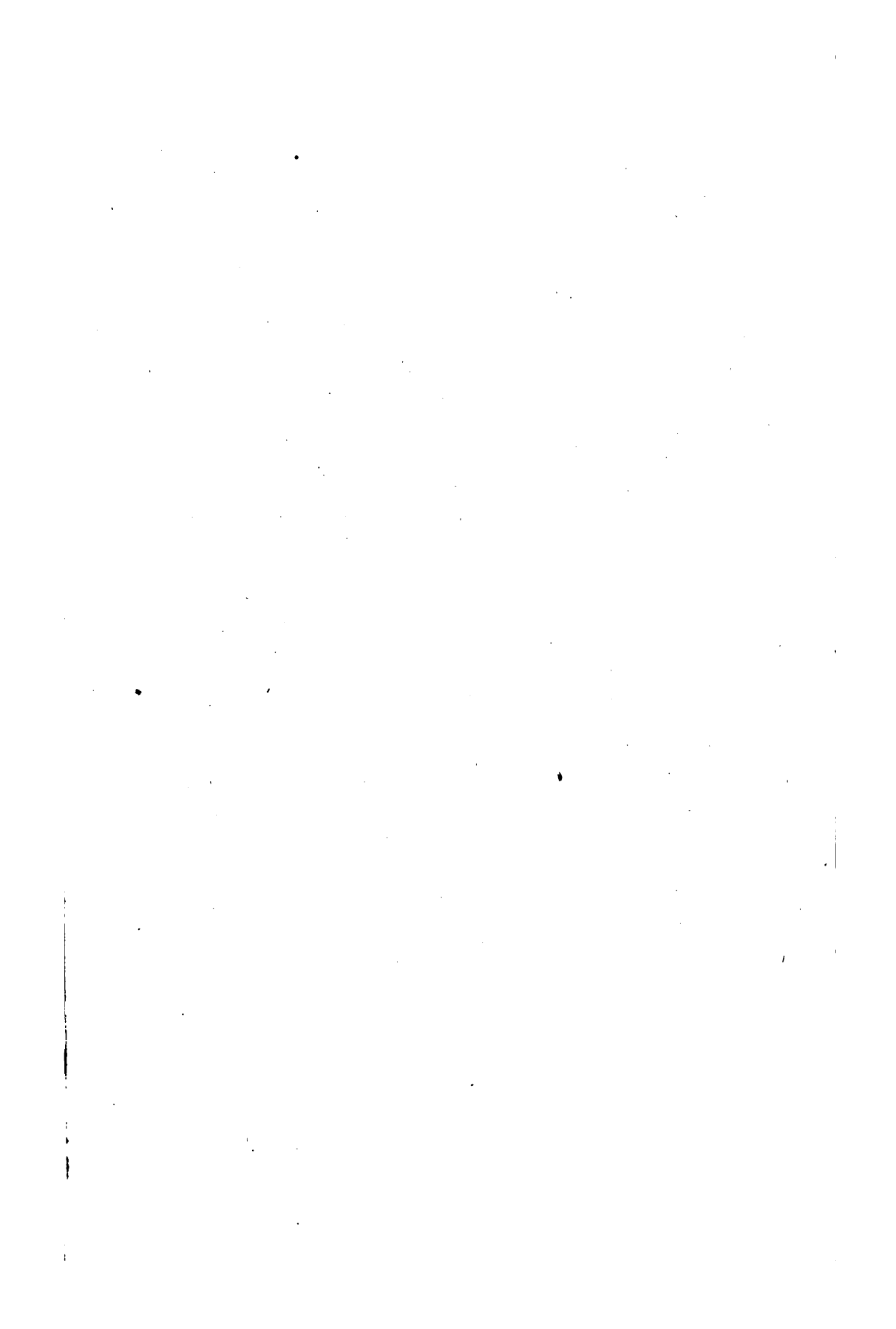
The greetings of the two parties that thus met under the lake, can be better imagined than described. There were hearty hand shakings, joyful congratulations, and loud huzzas, which resounded through the cavernous depths. Mr. Offerman, superintendent of the work, was the first who stepped from one section to the other of the Tunnel. The joy of the contractors, at this happy termination of their gigantic labor, cannot be described with any sort of justice. But they were not more pleased than were the people of Chicago when they heard the glad tidings. The party that had come down *via* the crib, consisting of Mr. Dull, Mr. Bramhall and others, proceeded westward, and soon arrived at the shore, being the first who passed completely through the Tunnel, from the crib.

As soon as the clay dividing the two sections was removed, it was no longer necessary to extract the foul air by means of the bellows at either shaft. A pure current of air rushed through the Tunnel, as if to seal its success.

On the night in which it was anticipated that the Tunnel would be completed, the gang of workmen were in charge of E. W. Offerman, son of the superintendent. That gentleman had received instructions to pursue the excavation to a certain distance, and then leave it. Twice had he measured and found that he had already permitted the workmen to go forward to the fatherest extremity, and yet the rod driven from the other side had not been reached. What was to be done? Had all their calculations been for naught? Was the shaft larger than had been supposed, or had the true course been deviated from? Seizing an auger near at hand, he thrust it into the clay, and commenced boring. A few turns, and it gave way before him as the point was faced upon the other side. The "trimming out" process revealed



BRICKING UP THE ARCH.



the iron rod, and the workmen returned to the mouth of the shaft to make the early morning ring with their rejoicing.

The successful meeting of the two tunneling parties was by no means the end of the contractors' work. All along the bore, at regular intervals, as before stated, chambers had been left, at the distance of one thousand feet from each other, for the convenience of the workmen. These remained to be bricked up, and the air pipes to be removed. Besides this, it would be necessary to clean the entire tube, before water could be passed through it. Much work also remained to be done at the crib, such as preparing the gates to let in the water, placing iron grating over the wells, to exclude anything that might be floating upon the surface of the lake, etc.

The site of the new Water Works is to be the same as the old, with the addition of  $187\frac{1}{2}$  feet of land west of Pine street, which the Board has purchased of Mr. Lill, and upon which, covering both it and the old site, the new building will be erected, the foundations for which are already laid. The erection of this magnificent structure, which will cost, when completed, \$55,000, will delay for several months the final letting in of water through the Tunnel. This building should have been erected long before the two sections of the Tunnel met, but the Board considered themselves too much engrossed in that work, to undertake another before it was successfully completed.

A new pumping engine, sufficiently powerful to elevate into the reservoirs, from the Tunnel, eighteen million gallons of water in twenty-four hours, has been purchased, which will be placed in the new building. This engine, which is the largest ever put up in the West, cost \$112,350. It was built from designs drawn by Mr. Cregier, the old engineer at the Water Works, and is a model of beautiful machinery.

When entirely completed, the new building and its surroundings will add greatly to the appearance of the locality where it is situated. It is but a short walk or drive

from any of the principal hotels, and will be visited by thousands of strangers annually. But they will not be able to go down into the Tunnel *then*, for it will have reached its entire completion, and instead of passing trains of visitors to the crib island in the lake, it will be furnishing the city of Chicago with what it has always most needed—AN ABUNDANT SUPPLY OF PURE WATER.

The Tunnel has been so constructed, that if it at any time needs repairs, the water can be immediately shut off at the crib, when the inclined plane of the Tunnel—two feet to a mile—will drain it completely, and workmen can descend into its depths, to repair any possible defect. But the work has been so uniformly well done, that it is not anticipated any such accidents will ever occur.

The last work performed will be to remove the stones which now fill the crib, and lay them in the cement. This will render the structure imperishable, even should the timbers of which it was originally formed decay.

By a glance at the drawing on the first page, the entire plan of the Tunnel will be understood at once. The shore shaft and crib are both shown, the miners are seen at work tunneling from either direction, and the lake, with vessels floating upon its bosom, lies over head.

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### THE SEALING STONE PUT IN PLACE.

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On Thursday morning, December 6th, 1866, people noticed that a large flag floated from the cupola of the Court House, in which building the Board of Public Works have their office. It was in honor of the final closing up of the Tunnel arch, at the point where the crib and shore sections met.

The Board of Public Works had previously extended invitations to the Common Council, Board of Education, and

many other prominent citizens, to witness the ceremonies. At the time fixed, about two hundred of the invited guests were on the spot, awaiting anxiously the rare adventure before them. The invitations stated that a number of the guests were to make a tour of the Tunnel from the shore shaft to the crib, and return by the lake, on board tugboats, while others went out to the crib first, and returned by the Tunnel railroad. Thousands of people were on the spot who had not received invitations, and who, of course, could not make the interesting voyage. It was wholly impossible that *all* could visit the great work.

The Board of Public Works had arranged to have two trains of cars pass through the Tunnel, from the shore to the crib, one leaving the shore shaft at ten o'clock and the other at half-past twelve, in the morning; and also to have a tugboat leave State street bridge, at corresponding hours, for the crib. Those who went out by the Tunnel railway were to return *via* the lake, and those who reached the crib by means of the tugboats, were to return to the shore through the Tunnel, on board the train which brought the other party. Twenty-one earth cars were put in readiness for the Tunnel trip, and the tugboat S. H. Crawford was chartered for service above the waves. The hour for starting was ten o'clock, at which time the entire party were on hand, full of eager expectation.

When the hour arrived, His Honor, Mayor Rice, the several members of the Board of Public Works, the Common Council, and as many of the other guests as could ride in the first train, were lowered into the shore shaft, where they entered the cars. The Mayor took the first car, to reach which he was obliged to do considerable crawling upon his hands and knees, and the other members of the party arranged themselves in the train, four persons occupying a car, one sitting in each corner. As the memorial stone was to be inserted upon the south side, the passengers were seated so as to face that point of the compass. As described



before, the motive power of the train was a mule, which could be dimly discerned in the gloom ahead. When all was in order, the train started off through the tube-like passage, the mule cantering along at a rapid pace. Many were the jests and jokes indulged in on this wonderful highway, as the cars sped out under the lake. There was also considerable temerity exhibited, as some of the passengers had never before visited the Tunnel.

At the distance of a mile and a half from shore, at the exact point where the two tunneling parties met, the train stopped. The Mayor and Board of Public Works left their seats, and advanced to the spot. Mr. Kershall, the City Inspector, said:

**Mr. Mayor, and Members of the Common Council:**

You have arrived at the spot where the two ends of the work are to be closed up. It only remains for you, Mr. Mayor, to place the last stone in position in this work, and we are going to help you do it.

Mayor Rice then came forward, and spoke as follows, amid the cheers of the guests:

**Members of the Board of Public Works, of the Board of Aldermen,  
Gentlemen Contractors and Fellow Citizens:**

At the commencement of this important work, the Mayor of the city, being its chief officer, and supposed to represent the sentiments of all our citizens, was appointed to remove the first shovelful of earth, thereby introducing that work and showing the world that that great undertaking should be done.

Now that this portion of it is completed, I have the great pleasure, and the honor, as being Mayor of the city, in like capacity to put the last finishing stroke upon this work, which is intended, as I understand it, to show to the world that the citizens of Chicago, through me, give this great work their approval.

His Honor then took the trowel and the stone, a perfectly white block of marble, one foot long by six inches wide, placed the cement in the interstices left in the arch, and finally deposited the key stone in its final place, remarking further as he did so, "Now, gentlemen, in behalf of the

city of Chicago, I place the last stone in this great Tunnel — the wonder of America and the world.” A number of pieces of American coin were then deposited inside the stone, by the guests, when the Mayor continued, “Gentlemen, I announce to you all, that the last stone in the Tunnel is laid, and that the work is completed.”

This was greeted with deafening cheers, which echoed and re-echoed through the Tunnel, adding greatly to the sublimity of the occasion.

It was now eleven o'clock, and the party, re-entering the cars, were soon at the crib shaft, appearing somewhat blinded by the light, as they ascended from beneath the lake. The party who came by the tug were already there, and many were the congratulations exchanged. In a short time the second train from the shore arrived, and the wondering passengers were also elevated to the large room in the crib. At this juncture cannon boomed upon the air, fired simultaneously from the crib and the shore. Some little time was spent in examining the wonderful structure upon which the visitors found themselves, and then the regular order of exercises proceeded.

Mr. J. G. Gindele, President of the Board of Public Works, addressed the visitors, in a brief speech, which was loudly cheered. In response, Mayor Rice spoke as follows:

Members of the Board of Public Works, Aldermen of the City of Chicago, and Fellow-Citizens, one and all:

The remarks last made by the President of the Board of Public Works render it unnecessary for the Mayor of Chicago to speak a word; but, as I am here, I would gladly testify, with such weak words as I can use, my appreciation of the wonderful work of which I have seen the completion to-day; and with the most bewildering and heartfelt joy I stand here among you to-day — this day of gladness, made doubly glad to us by the genius of man. This great work — wonderful and novel in its plan, perfect and satisfactory in its execution — is completed. We have seen it. It is now an accomplished fact — no less a fact than the means of furnishing every inhabitant of the city of Chicago with pure, sweet water; and a supply in excess of the demand, sufficient for a million of inhabitants more.

All honor and thanks to the men who conceived and to the men who executed this great work. (Cheers.) And I would congratulate the favored citizens of Chicago, here, that they have the healthy winds from our boundless prairies, that they have the life-sustaining bread of our perfectly cultivated fields, that they have the pure, refreshing water from our mighty lake, all of which tend to make Chicago the most favored of cities.

I do not intend to enter into statistics as to when the Tunnel was commenced, how it has progressed, how difficulties have been met at every turn, how these difficulties have been surmounted, how men doubted at its commencement, how those doubts are now forever set at rest; but I will unite with you all in saying: Hail! Chicago, metropolis of the great West, vast in her resources, fortunate in her citizens, whose genius, industry and integrity secure to us the use of all those advantages and blessings which are vouchsafed to us by the Creator and Dispenser of all the things which we have.

Addresses were also made by Aldermen Holden and Clark, and D. D. Driscoll, Esq., the Corporation Attorney. Mr. Chesbrough likewise made a short speech, in which he claimed that great credit and praise were due Messrs. Dull & Gowan, the contractors, upon whom the entire responsibility of the great work had rested.

After partaking of a fine collation, prepared in the kitchen of the crib, the party that came by the tug started off for the shore, *via* the Tunnel railroad, and the mayor, aldermen, etc., took passage on the tug.

The stone laid by Mayor Rice bore the following inscription:

<p>CLOSED, December 8, 1866.</p>
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## RECAPITULATION.

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The verdict has been pronounced, and the civilized world is now fully satisfied that the great Chicago Lake Tunnel is a sublime success. When put in operation, it will pass from the lake to the shore, under a two-feet head, every twenty-four hours, nineteen million gallons of water; under a head of eight feet, thirty-eight million gallons, and under a head of eighteen feet, seventy-five million gallons. The velocities for the above quantities will be one and four-tenths mile per hour, when the head is two feet; two and three-tenths mile per hour, the head being eight feet, and four and two-tenths mile per hour, the head being eighteen feet. With a head of eighteen feet, it will be capable of supplying one million of people with fifty-seven gallons of water each, every day, which is a capacity quite equal to that of the Croton aqueducts, or any other water works in the world.

When the Tunnel is entirely completed, the chambers left for the convenience of the workmen bricked up, etc., it will contain about two millions six hundred thousand bricks. Ten thousand four hundred and sixty-seven barrels of cement, or one barrel to every lineal foot, were used in laying the masonry.

The connection with the Tunnel shaft at the Water Works will be made at a depth of thirty-one feet from the bottom, for which a "blind arch" was prepared in the masonry. From this, shafts are to be driven a distance of two hundred feet, to the first distributing well, and thence one hundred and fifty feet to others.

The lake Tunnel has already been pronounced the eighth wonder of the world. No person can visit it, and make a tour over its two miles of sub-lacustrine railway, emerging upon the Gibraltar in the lake which forms its eastern

terminus, without being awed by the sublimity of the undertaking, and the perseverance and untiring energy that have accomplished the grand result. If Chicago is a marvel, a giant among cities builded centuries before its location was marked upon the map, then is this the greatest achievement of any age, peculiarly her own offspring. Antiquarians never found a parallel, in years of search among ruined cities, and historians record nothing that bears a semblance to this mighty work of engineering. It is a monument of the ever-progressive, ever-growing West; a natural outgrowth of her capital city. Had such a tunnel been unearthed beneath the bed of some now extinct sea or body of water in the old world, thousands of thirsty travelers would cross the desert to write of its marvelous extent, and astonish the world by the great discovery. There is no dust of centuries to throw a halo of glory over the great Chicago Lake Tunnel; its masonry is yet fresh from the trowel of the artisan. Yet it has already become the Mecca of travelers, and not to have seen it is quite as disreputable as not to have visited the Vatican at Rome, or seen the sun of the desert rise upon the pyramids of Egypt.

But a few weeks will elapse, after the publication of this sketch, before the citizens of Chicago will be blessed with PURE WATER, obtained two miles from the shore of Lake Michigan, through the fabulous causeway they have cut beneath its waves. Then will the welkin ring with the shouts of tens of thousands of voices; then will Chicago celebrate as never city celebrated before. She will invite the Croton-satiated New Yorkers to come and taste the pure waters of Lake Michigan, and the Bostonians to drink of her nectar.

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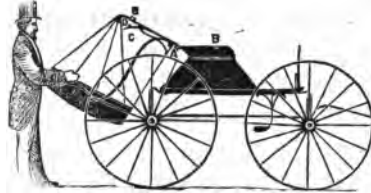


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